

said leadframe intended for solder attachment.” Lee (col. 2, lines 25-38) teaches that “a gold thin layer can be formed on part of the external leads to protect the outermost palladium layer.” However, Lee notes that use of a thin gold layer increases production costs and provides “bad” adhesiveness to mold resin. These statements in Lee are clear indications that Lee is not selectively plating gold on segments of the leadframe intended for solder attachment (why else would Lee worry about adhesiveness of gold to mold compound?), but is rather the plating of gold extensively over the external leads, and is therefore teaching away from the claimed invention. Moreover, Lee also notes that the gold layer reduces wetting time by expediting smooth dissolution of palladium and lead, but that the thin gold layer forms Au-Sn, thereby degrading solderability. Lee, therefore, teaches away from its use in enhancing solderability. For at least these reasons, Applicant respectfully submits that Claim 1 is patentable over Lee.

Claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipated by Hashizume (U.S. Patent No. 5,946,556). Applicant respectfully traverses the rejection. As noted above, Claim 1 includes the feature of “gold selectively plated on segments of said leadframe intended for solder attachment.” Hashizume (col. 10, lines 26-34) merely states that surfaces of a die pad and lead fingers are plated with a metal such as gold (Au) or silver (Ag). Hashizume does not state whether the entire leadframe is covered with the gold or silver layer, but it is clear that the gold or silver is not selective to segments of the leadframe intended for solder attachment. Therefore, Applicant respectfully submits that Claim 1 is patentable over Hashizume.

Claims 2 to 13, 15 and 23 to 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott (U.S. Patent No. 6,245,448) in view of Akino, et al. (Japan Patent Application #2000-77593) and further in view of Lee et al. (U.S. Patent No. 6,232,651). Claim 2, as amended, includes the feature of “gold selectively plated on segments of said leadframe intended for solder attachment.”

Abbott does not teach or suggest such a feature. Similarly, although Akino teaches the gold flash plating of the entire surface of the lead frame, such a teaching is merely cumulative to the art acknowledge in Applicant's specification (page 3, lines 18-19). As indicated above, Lee does not teach or suggest the claimed feature, but instead actually teaches away from the selective use of gold on leadframe segments intended for solder attachment. Therefore, Applicant submits that Claim 2 is patentable over the combined references since that combination does not teach or suggest all of the claimed features of the invention. Claims 3-9 depend from Claim 2 and are therefore patentable over the combined references for at least the reasons presented above. Claim 10 depends from Claim 1, which includes the same feature as cited above in Claim 2. Therefore, Claim 1, and Claim 10 which depends therefrom, are patentable over the combined references. Similarly, Claim 11 includes the same feature as cited above in Claim 2. Therefore, Applicant submits that Claim 11, and Claims 12 and 13 which depend therefrom, are patentable over the combined references for at least the reasons presented above. The rejection of Claim 23 was not explained in the Office Action, but Applicant respectfully submits that Claim 23 is patentable over the cited combination of references for at least the reasons presented above for Claim 2.

Claim 24 includes the feature "wherein said layer of palladium has a thickness in the range of about 0.03% to about 6% of a thickness of said nickel layer." The rejection is based upon the Examiner's assertion that no showing as to the criticality of the claimed dimensions has been made by Applicant. Applicant disagrees and refers the Examiner to page 11, lines 19-22 of the instant specification where it is stated that "it is important that the present invention reduces [the palladium layer] thickness from the value it customarily had (about three times larger)." See also page 11, lines 25 to 29 where it is stated that "[i]n this thickness range, palladium is suitable for all wire bonding attachments (stitch bonds, ball bonds, and wedge bonds) and retains its excellent adhesion to thermoplastic molding compounds – an attribute crucial for avoiding package delamination and progressive corrosion." Thus the "criticality"

of the dimensions described in Claims 24-26 is well established in the record. Applicant therefore requests that the rejection of the these claims be withdrawn.

Claims 2 to 13, 15, and 23 to 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Abbott in view of Akino in view of Hashizume. Claims 1, 2 and 11, as amended, include the feature of "gold selectively plated on segments of said leadframe intended for solder attachment." Abbott does not teach or suggest such a feature. Similarly, although Akino teaches the gold flash plating of the entire surface of the lead frame, such a teaching is merely cumulative to the art acknowledged in Applicant's specification (page 3, lines 18-19). As indicated above, Hashizume does not teach or suggest the selective plating of gold on leadframe segments intended for solder attachment. Since the combined references do not teach or suggest all of the claimed features, Applicant submits that Claims 1, 2 and 11, as well as Claims 3-13 and 15 depending therefrom, are patentable over the combined references. Again, the rejection of Claim 23 was not explained in the Office Action, but Applicant respectfully submits that Claim 23 is patentable over the cited combination of references for at least the reasons presented above for Claim 2. Again, the rejection of Claims 24-26 is based upon the Examiner's assertion that no showing as to the criticality of the claimed dimensions has been made by Applicant. Applicant refers the Examiner to the above argument regarding Claims 24-26, as that argument will not be repeated here.

The Office Action contains the statement that, with respect to Claims 3 to 8, that the specification "contains no disclosure of either the critical nature of the claimed dimensions or any unexpected results arising therefrom." Applicant disagrees. The importance of decreasing the thickness of the palladium layer is clearly indicated on page 11 of the instant specification (see the third paragraph on that page). In addition, the specification makes clear the significance of the relative thicknesses of the nickel (ductility), palladium (wire bonding and mold

compound adhesion), and gold (prevent oxidation of the palladium as a result of soldering).

Rebuttal to Examiner's Comments

The "Response" section of the Office Action contained the comment "[i]n the examination of the claims the Examiner is interested in finding the final structure of the claim language". Applicant does not understand the intent of the Examiner's comment. Is it an objection to Applicant's amendment of the claims?

With regard to the Lee reference, the Examiner's comments appear to be a simple dismissal of Applicant's arguments, which are restated hereinabove. Applicant is, of course, still of the opinion that these arguments overcome the rejection.

With regard to Hashizume, the Examiner's comments include the following statement "[a]pplicant's claim does not claim that the entire leadframe need to be covered with the gold or silver layer, so was not be to examiner." Applicant is having trouble understanding the meaning of this statement. The remainder of the Examiner's comments appear to be a simple dismissal of Applicant's arguments, which are restated hereinabove. Applicant is still of the opinion that these arguments overcome the rejection.

Applicant respectfully requests reconsideration and withdrawal of the rejections and allowance of Claims 1-13, 15 and 23-26. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

25. (amended) The packaged semiconductor device of Claim 24, wherein said layer of nickel has a thickness in the range of about 500 nm to about 3000 nm and said palladium layer has a thickness in the range of about 10 nm to about 30 nm.

26. (amended) The packaged semiconductor device of Claim 24, wherein said gold has a thickness in the range of about 6% to about 50% of said thickness of said palladium layer.